

# Chapter 11

## POWER TAKE OFF (P.T.O.)

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1. TRANSMISSION P.T.O.
2. TRANSMISSION MODELS TO BE INSTALLED HINO'S VEHICLES
3. OTHER NOTICES
4. MOUNTING POSITION OF TRANSMISSION P.T.O. ASSY
5. ENGINE REV. CONTROL FOR MOUNTING OF BODY OR EQUIPMENT
6. P.T.O. SIGNAL FOR ALLISON TRANSMISSION

## 1. TRANSMISSION P.T.O.

When P.T.O. is necessary for body or equipment mounting to Hino vehicles, contact directly in the nearby transmission manufacturer as following or HMC or Hino authorized dealer.

- In case of the vehicle equipped Allison automatic transmissison, contact to ALLISON Transmission Division (ATD) distributors or dealers.

## 2. TRANSMISSION MODELS TO BE INSTALLED HINO'S VEHICLES

MODEL			NE8J	NJ8J	NF8J	NV8J	NH8J
TRANSMISSION	MANUAL		Eaton Fuller FS-5406A (6-speed) (J08E-WU)	Eaton Fuller FS-5406A (6-speed) (J08E-WU)	Eaton Fuller FS-6406A (6-speed)	Eaton Fuller FS-6406A (6-speed)	Eaton Fuller FS-6406A (6-speed)
	AUTO	STD	Allison 2200HS (J08E-WU) Allison 2500RDS (J08E-VB)	Allison 2200HS (J08E-WU) Allison 2500RDS (J08E-VB)	Allison 2500RDS	Allison 3000RDS	Allison 3000RDS
		OPT	Allison 2200RDS Allison 2500HS  Allison 2200HS (J08E-VB) Allison 2500RDS (J08E-WU)	Allison 2200RDS Allison 2500HS  Allison 2200HS (J08E-VB) Allison 2500RDS (J08E-WU)	Allison 2500HS	Allison 2500RDS Allison 2500HS Allison 3500RDS	Allison 3500RDS

## 3. OTHER NOTICES

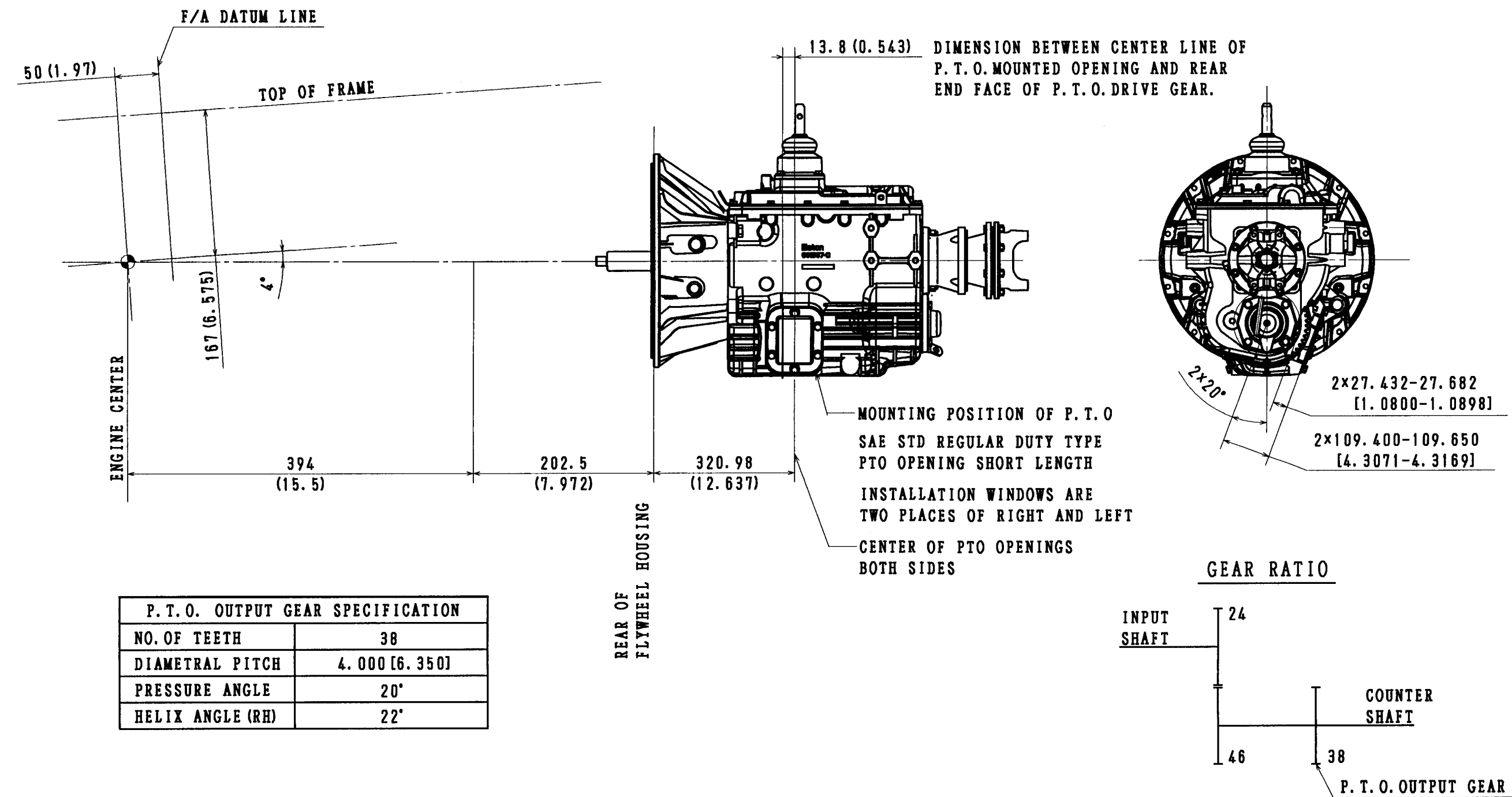
If a P.T.O. is installed make sure it works properly and meets the respective manufactueres guidelines for application, installation, and operation.

NOTE : 2200HS and 2500HS does not have P.T.O. gear.

4. MOUNTING POSITION OF TRANSMISSION P.T.O. ASSY

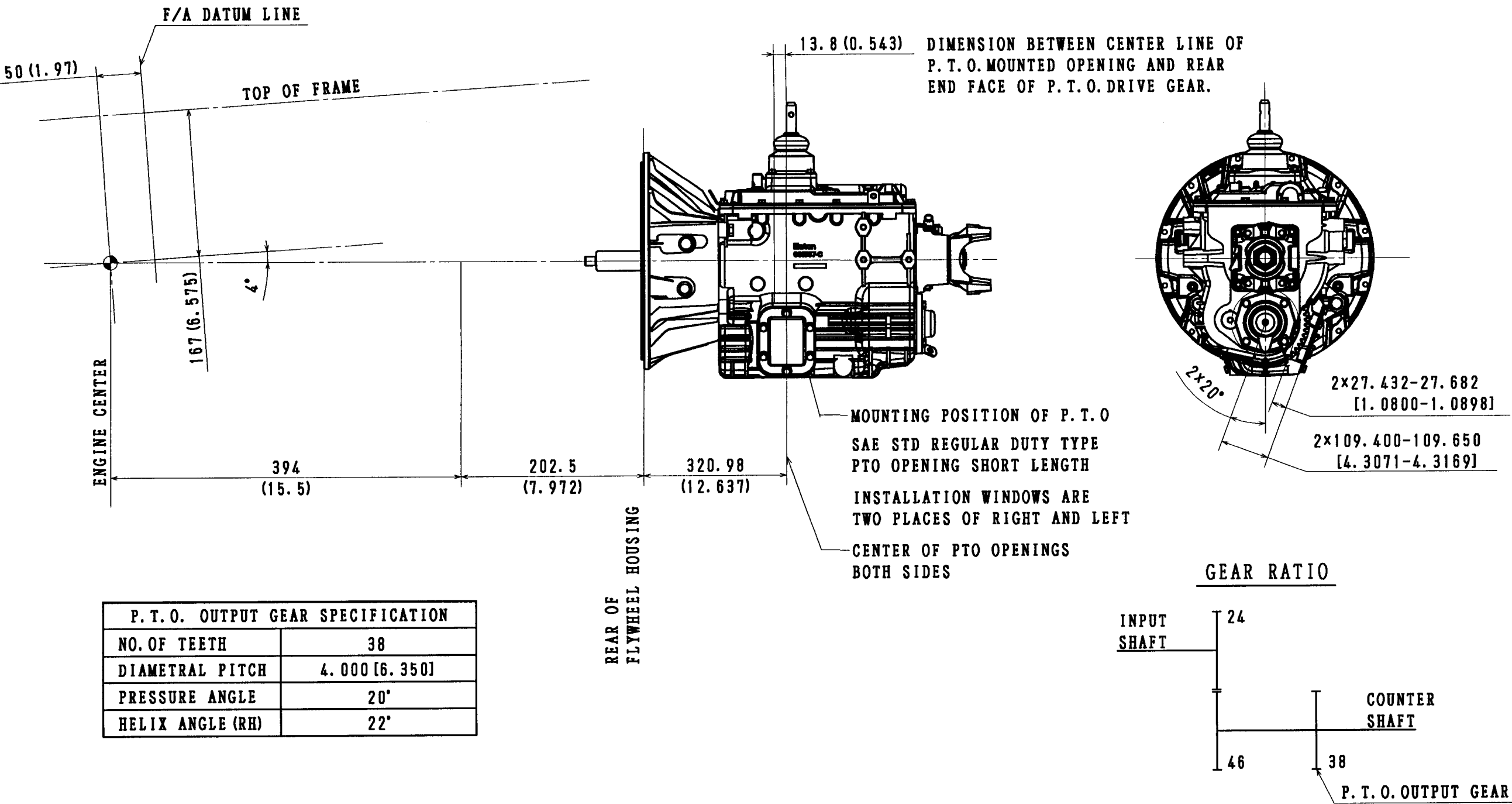
- TRANSMISSION MODEL : EATON FULLER FS-5406A
- CHASSIS MODEL : NE8J (J08E-WU) AND NJ8J (J08E-WU)

Unit : mm (in.)



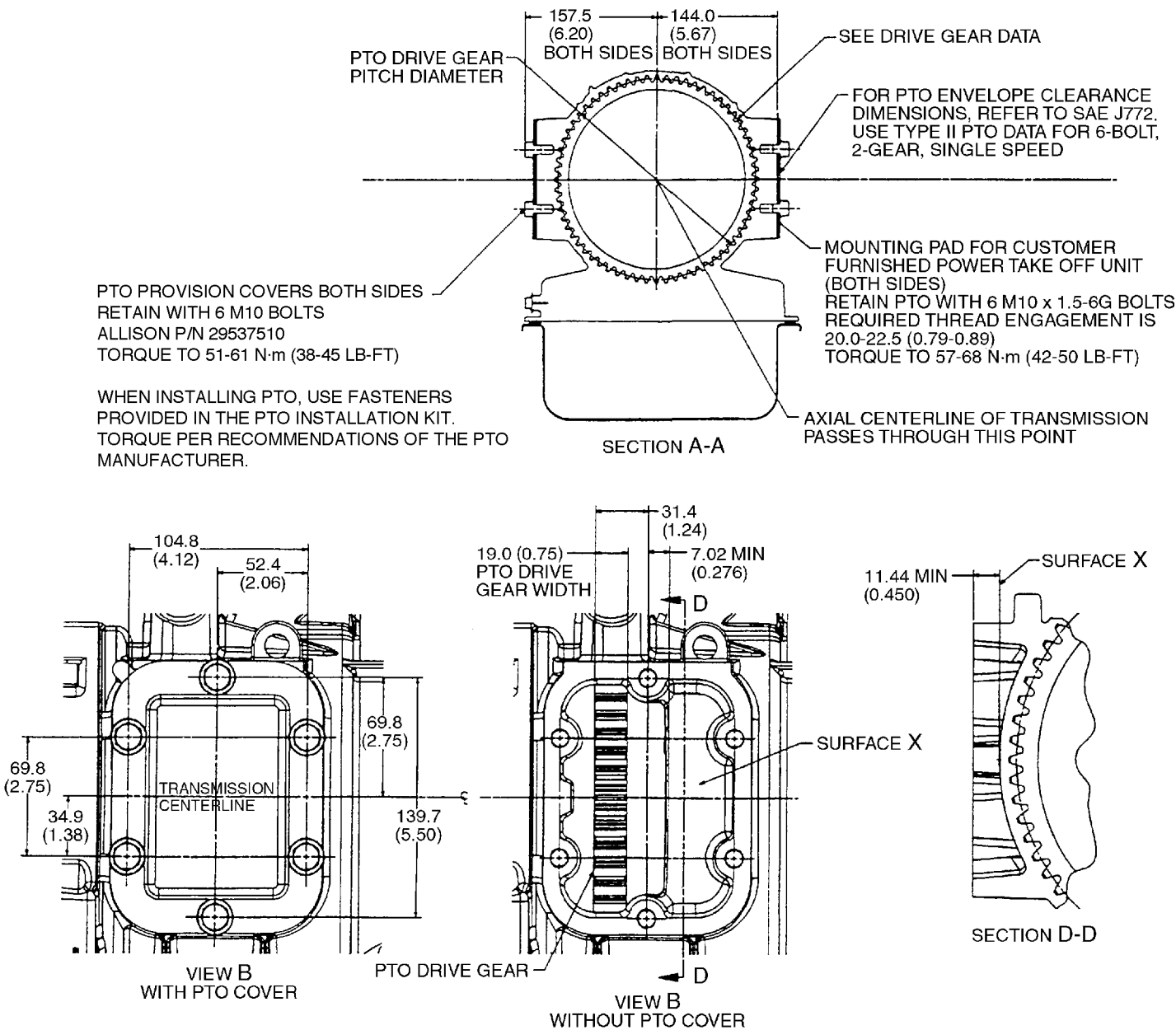
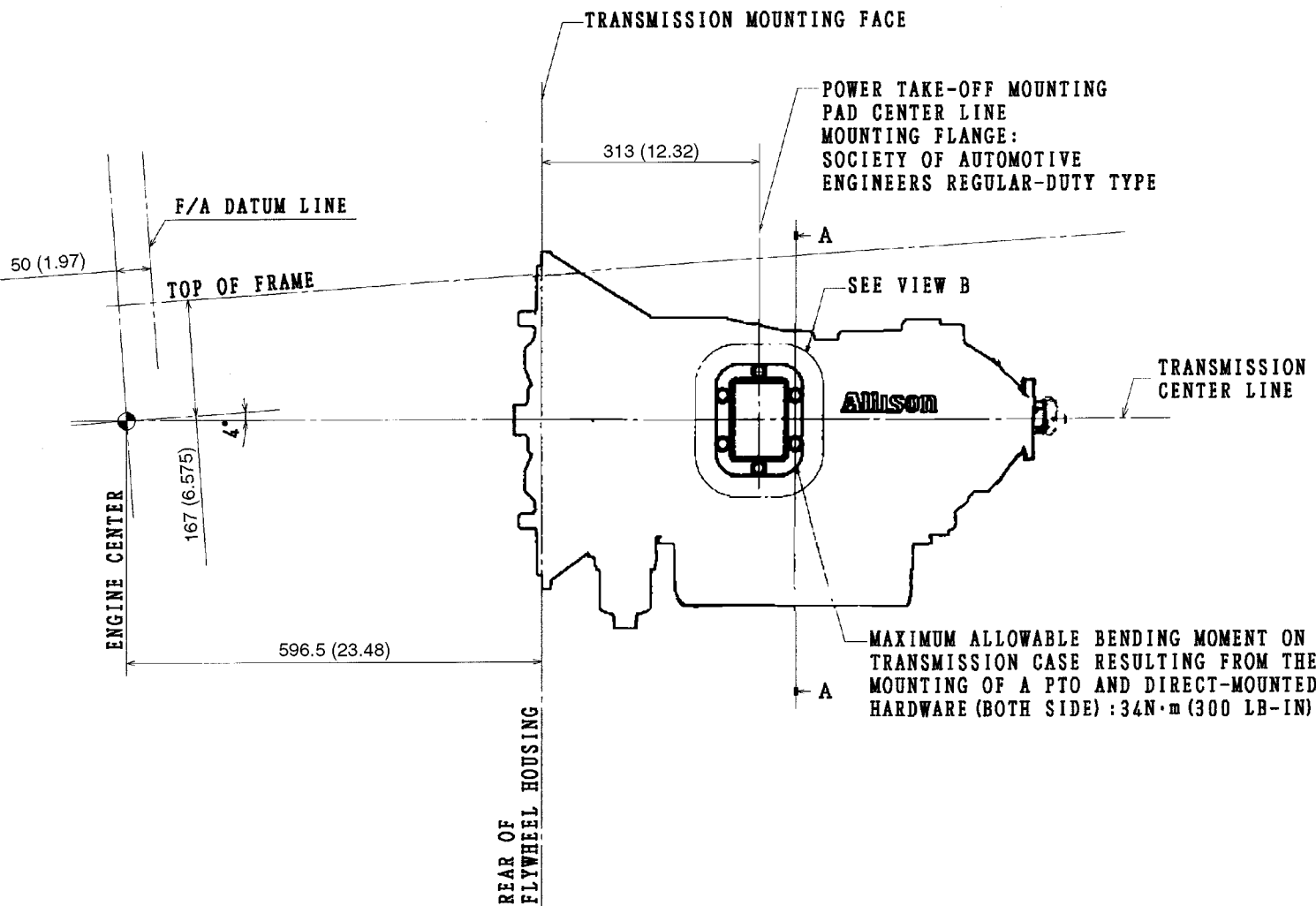
- TRANSMISSION MODEL : EATON FULLER FS-6406A
- CHASSIS MODEL : NF8J, NV8J AND NH8J

Unit : mm (in.)



- TRANSMISSION MODEL : ALLISON 2200RDS
- CHASSIS MODEL : NE8J (STD:J08E-WU) AND NE8J (OPT:J08E-VB),  
NJ8J (STD:J08E-WU) AND NJ8J (OPT:J08E-VB)

Unit : mm (in.)



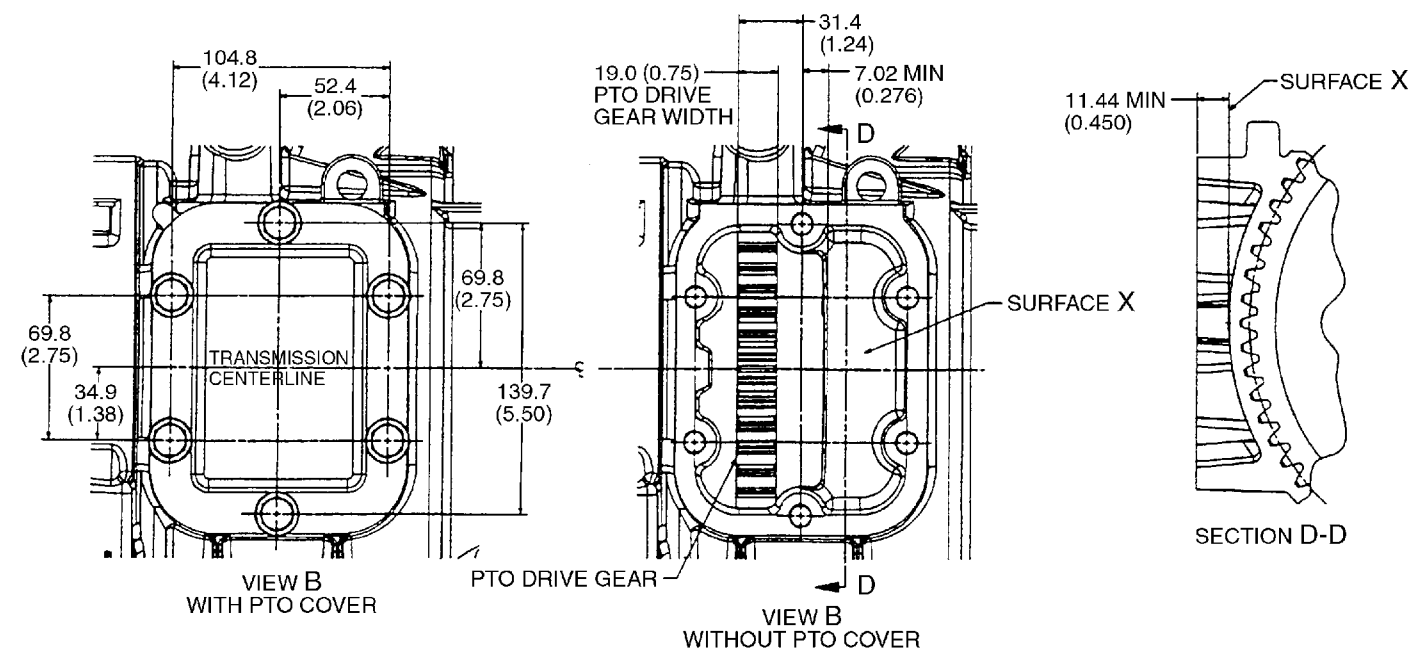
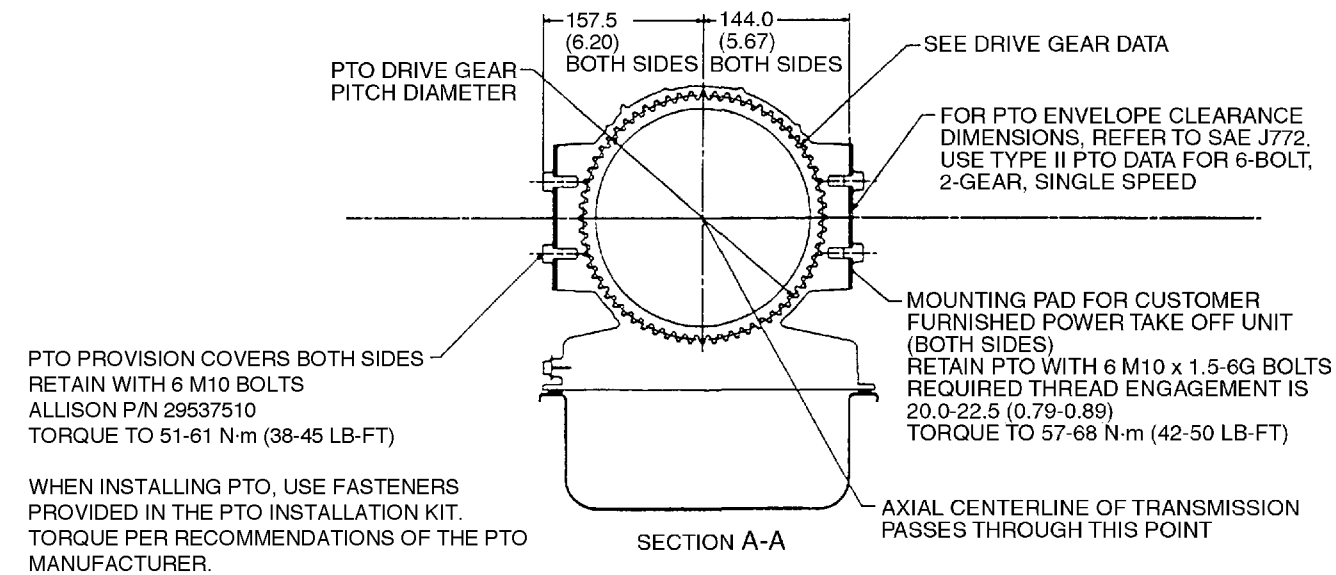
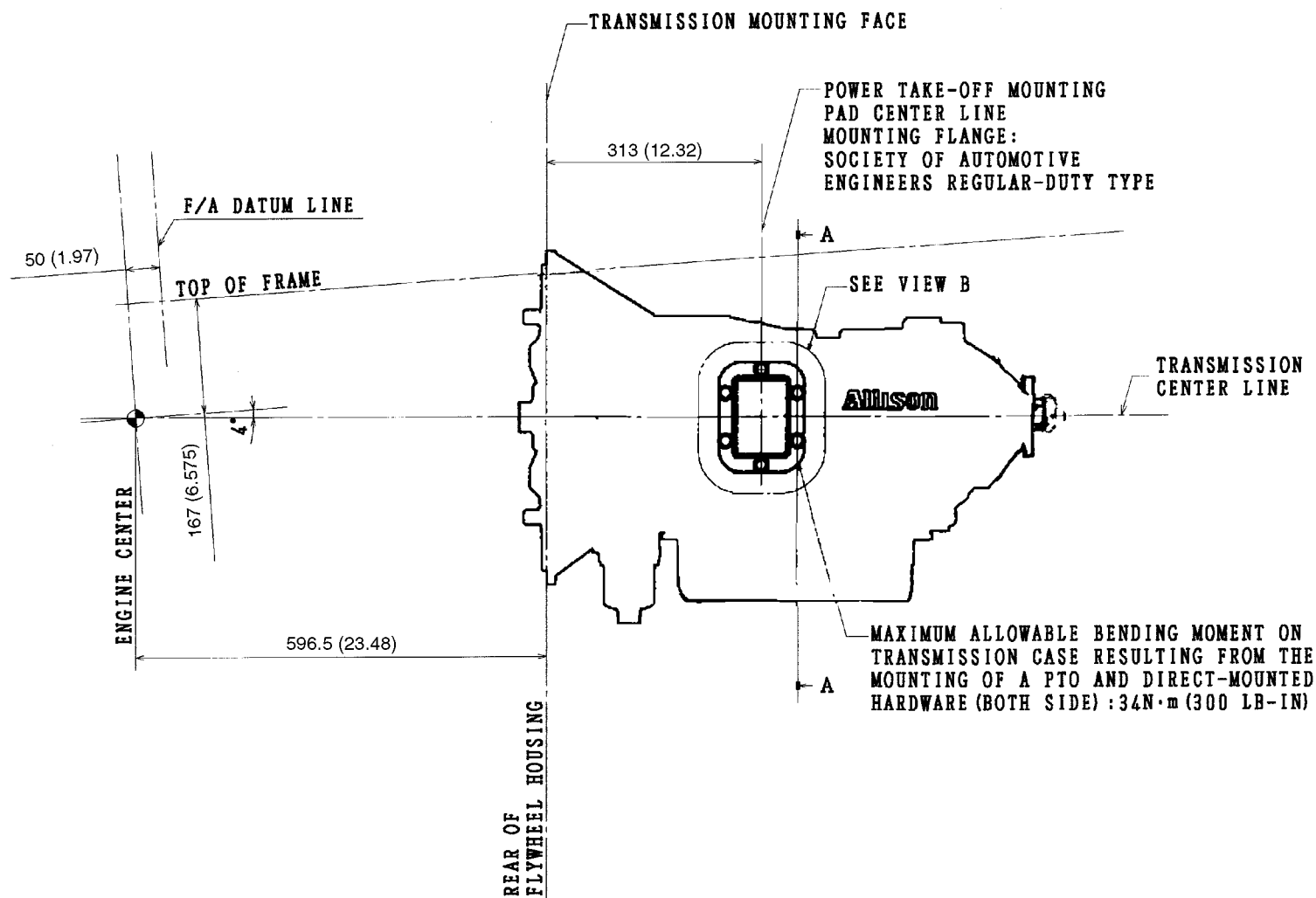
• POWER TAKE OFF DRIVE GEAR RATINGS

TRANSMISSION CONFIGURATION	VALUE	UNIT
With P.T.O. on One Pad (Continuous)	339 (250)	N·m (pound-foot)
With a P.T.O. on Both Pads Simultaneously – Each, Continuous	271 (200)	N·m (pound-foot)

DRIVE GEAR DATA DIMENSIONS IN INCHES		DRIVE GEAR SPEED	
TEETH 64		NEUTRAL = TURBINE SHAFT SPEED (SPEED VARIES WITH P.T.O. LOAD. SEE INSTALLATION MANUAL FOR COMPLETE SPEED RELATIONSHIP)	
PITCH 6.865		2200 SERIES	
PRESSURE ANGLE 20°		1st GEAR	3.10 x OUTPUT SHAFT SPEED
NORMAL MODULE 3.7		2nd GEAR	1.81 x OUTPUT SHAFT SPEED
PITCH DIAMETER 9.32283		3rd GEAR	1.41 x OUTPUT SHAFT SPEED
0.006-0.029 NORMAL OPERATING BACKLASH AFTER P.T.O. IS INSTALLED		4th GEAR	1.00 x OUTPUT SHAFT SPEED
		5th GEAR	0.71 x OUTPUT SHAFT SPEED
		6th GEAR	0.61 x OUTPUT SHAFT SPEED
		REVERSE GEAR	4.49 x OUTPUT SHAFT SPEED

- TRANSMISSION MODEL : ALLISON 2500RDS
- CHASSIS MODEL : NE8J (STD:J08E-VB) AND NE8J (OPT:J08E-WU),  
NJ8J (STD:J08E-VB) AND NJ8J (OPT:J08E-WU), NF8J AND NV8J (OPT)

Unit : mm (in.)

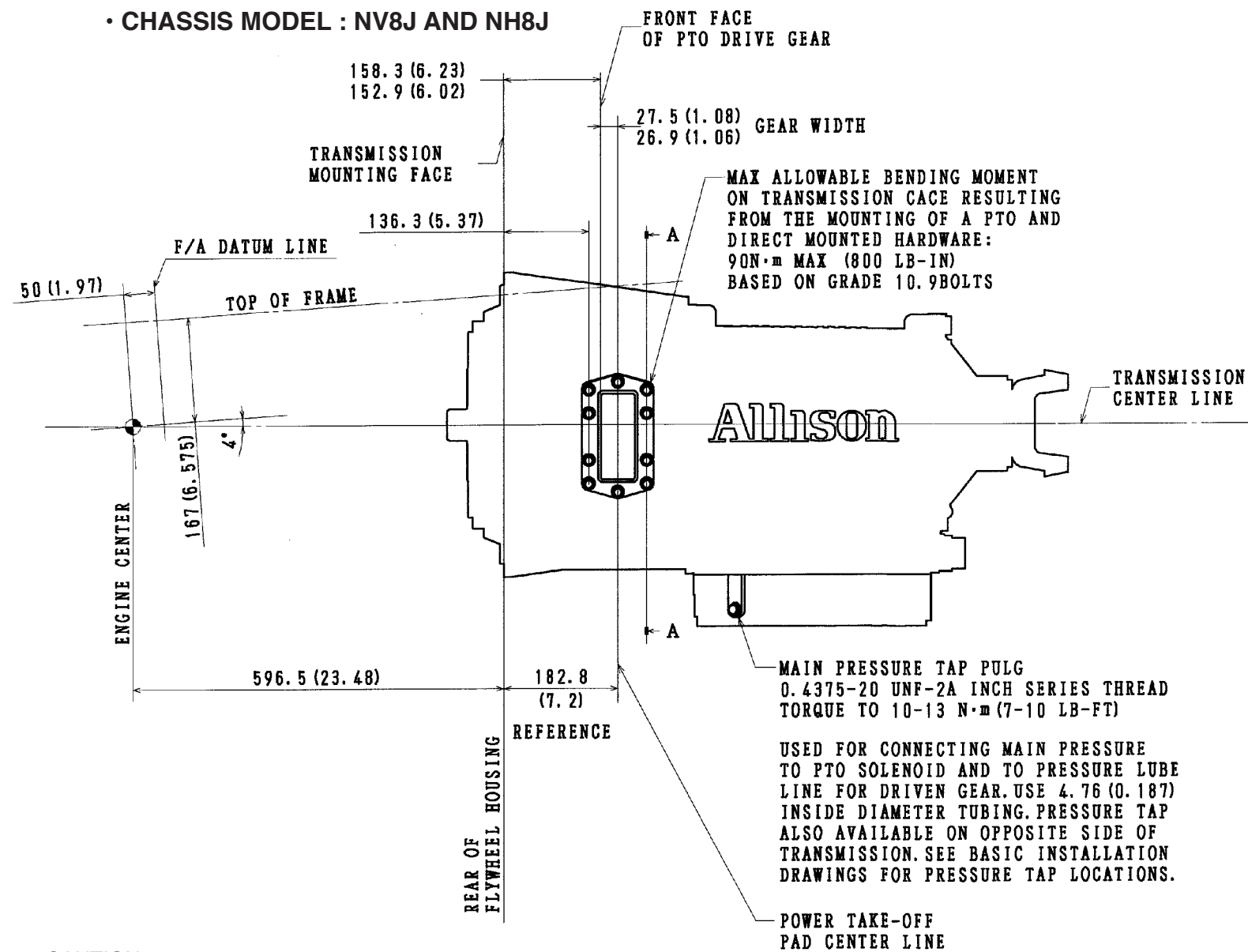


• POWER TAKE OFF DRIVE GEAR RATINGS

TRANSMISSION CONFIGURATION	VALUE	UNIT
With P.T.O. on One Pad (Continuous)	339 (250)	N·m (pound-foot)
With a P.T.O. on Both Pads Simultaneously – Each, Continuous	271 (200)	N·m (pound-foot)

DRIVE GEAR DATA DIMENSIONS IN INCHES		DRIVE GEAR SPEED	
TEETH 64		NEUTRAL = TURBINE SHAFT SPEED (SPEED VARIES WITH P.T.O. LOAD. SEE INSTALLATION MANUAL FOR COMPLETE SPEED RELATIONSHIP)	
PITCH 6.865		2500 SERIES	
PRESSURE ANGLE 20°		1st GEAR	3.51 x OUTPUT SHAFT SPEED
NORMAL MODULE 3.7		2nd GEAR	1.90 x OUTPUT SHAFT SPEED
PITCH DIAMETER 9.32283		3rd GEAR	1.44 x OUTPUT SHAFT SPEED
0.006-0.029 NORMAL OPERATING BACKLASH AFTER P.T.O. IS INSTALLED		4th GEAR	1.00 x OUTPUT SHAFT SPEED
		5th GEAR	0.74 x OUTPUT SHAFT SPEED
		6th GEAR	0.64 x OUTPUT SHAFT SPEED
		REVERSE GEAR	5.09 x OUTPUT SHAFT SPEED

- TRANSMISSION MODEL : ALLISON 3000RDS AND 3500RDS
- CHASSIS MODEL : NV8J AND NH8J



CAUTION:

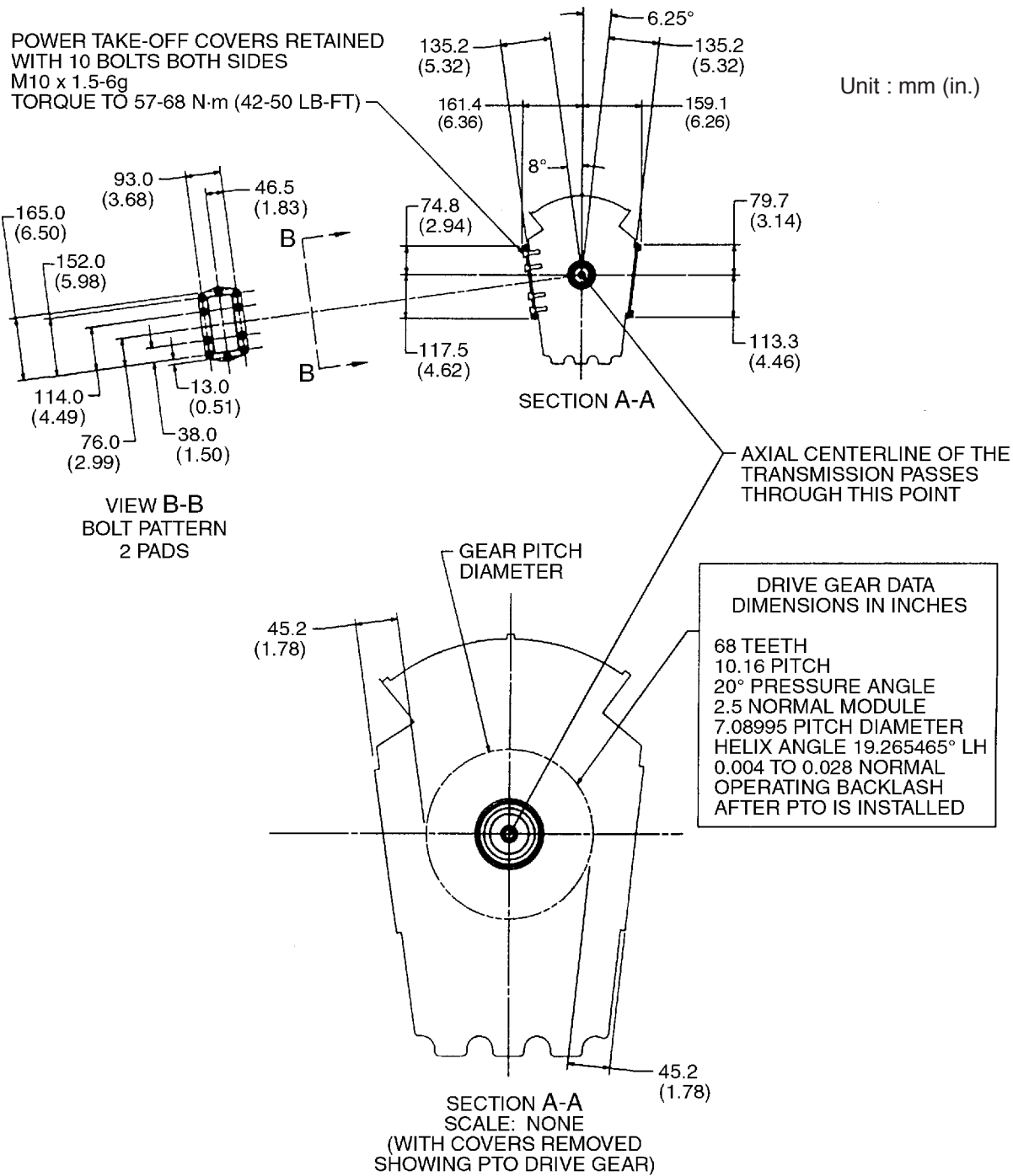
Torques shown for customer-furnished fasteners and threaded components are for plain (non-plated) threads. Torque requirements should be reviewed if plated items will be used. Consult the supplier.

P.T.O. output speed (rpm):

Engine speed x  $\frac{\text{Drive gear}}{\text{Driven gear}}$  x  $\frac{\text{P.T.O. input gear}}{\text{P.T.O. output gear}}$

• POWER TAKE OFF DRIVE GEAR RATINGS

TRANSMISSION CONFIGURATION	VALUE	UNIT
Drive Gear Torque (Continuous Operation)		
With P.T.O. on One Side	660 (485) Max.	N·m (pound-foot)
With P.T.O. on Both Sides	930 (685) Max.	N·m (pound-foot)





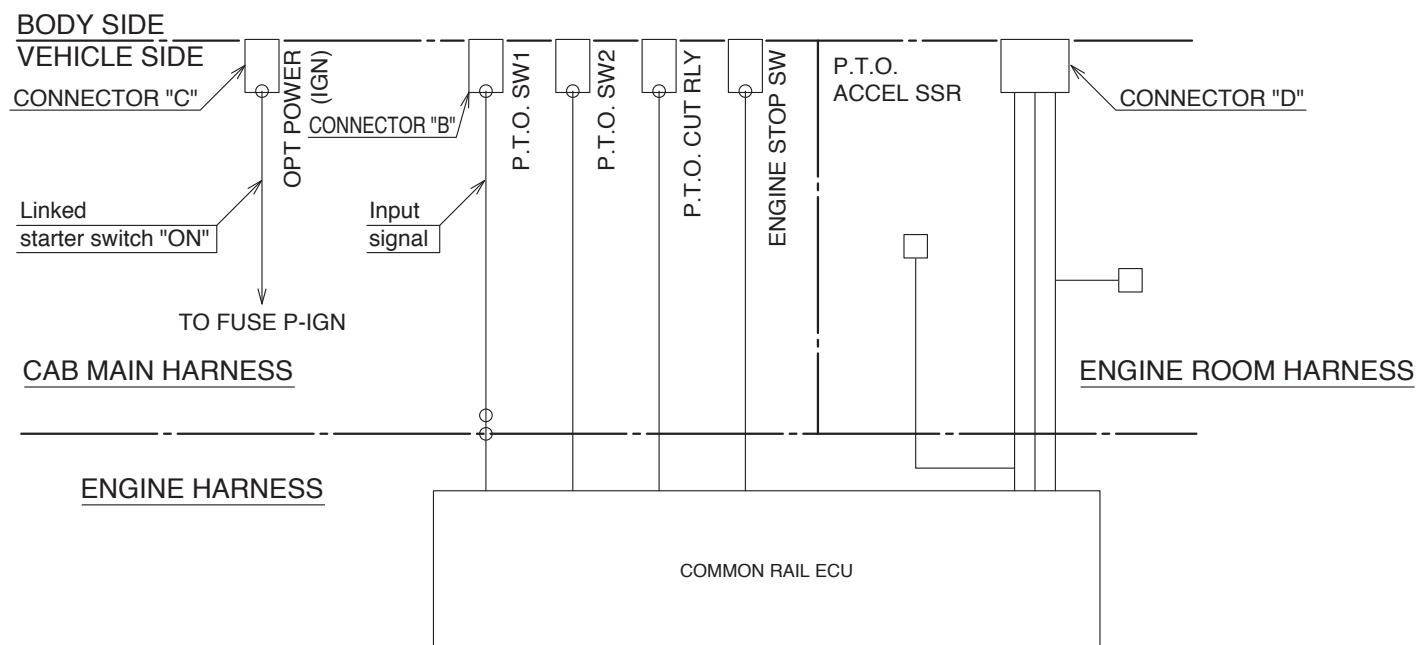
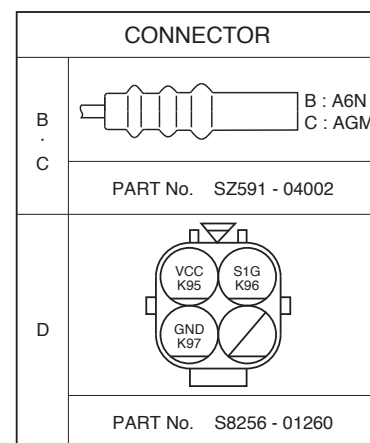
## 5. ENGINE REV. CONTROL FOR MOUNTING OF BODY OR EQUIPMENT

Engines which are mounted to the Hino truck models are controlled by a electric computer. Make sure following procedure how to control of engine revolution (speed) hereinafter collectively referred engine revolution when provide power take off device (ex. Transmission P.T.O.) in order to control mounted body or equipment.

### ELECTRIC CIRCUIT DIAGRAM RELATED WITH ENGINE REVOLUTION CONTROL WHICH IS ORIGINALLY PROVIDED IS FOLLOWING FIGURE.

#### WARNING

- Whatever P.T.O. control system is mechanical or pneumatic or electric, the signal circuit of P.T.O. switched on is always connected with engine control computer.
- This alteration including provision of P.T.O. unit etc. must be provided own responsibility of Body or Equipment Manufacturer.
- Standard function of Engine Acceleration Control by accelerator pedal inside of cabin is cancelled during operation of body or equipment by this system.



- [Note] • Refer to "COMMON RAIL CIRCUIT" and "CONNECTORS" in Chapter 12.
- Connector B and C are provided under the center cluster, instrument panel in cab.
  - Connector D is provided in the right frame.
- (See chapter 7 "ELECTRICAL POWER SOURCES" for detailed psition.)



## PROCEDURE TO PROVIDE ENGINE REVOLUTION CONTROL DEVICE

### EXAMPLE A

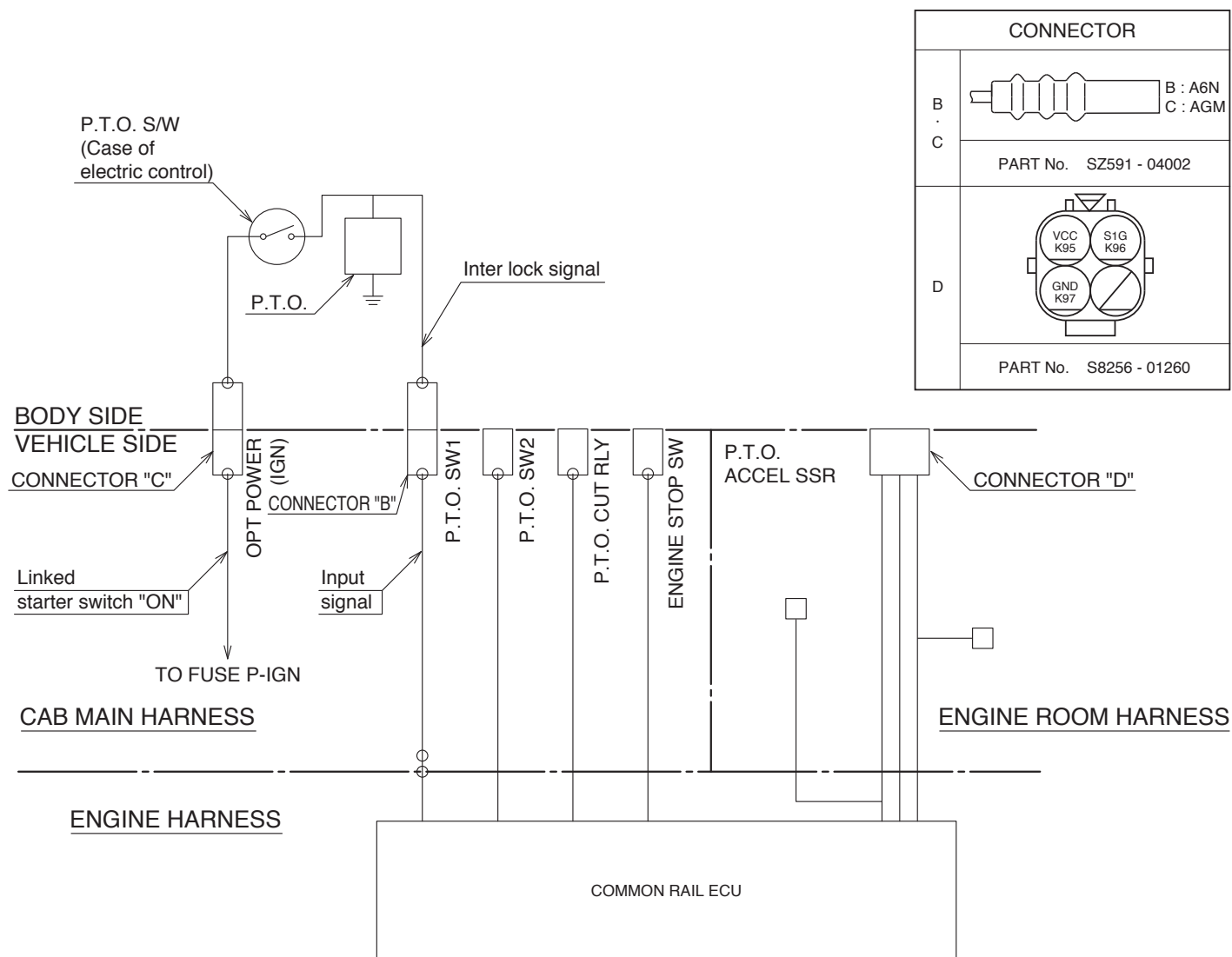
(In the case, engine idle-up at the same time with P.T.O. switched on.)

Condition to be adapted this engine idle-up method as follows.

- Required torque of P.T.O. : MAX 147 N·m (108 lb·ft).
- Control range of engine revolution : Idle to MAX 1800 rpm.

Make sure to wire the electric circuit as following figure.

When set up engine revolution, please consult with HMC.  
The detail of customization is described in HINO-DXII.



## EXAMPLE B

(In the case, the P.T.O. received heavy torque load or required constant engine revolution.)

Condition to be adapted this engine idle-up method as follows.

- Required torque of P.T.O. : OVER 147 N·m (108 lb·ft) to MAX.  
(to be limited by transmission and P.T.O. manufacture.)
- Control range of engine revolution : Idle to MAX.

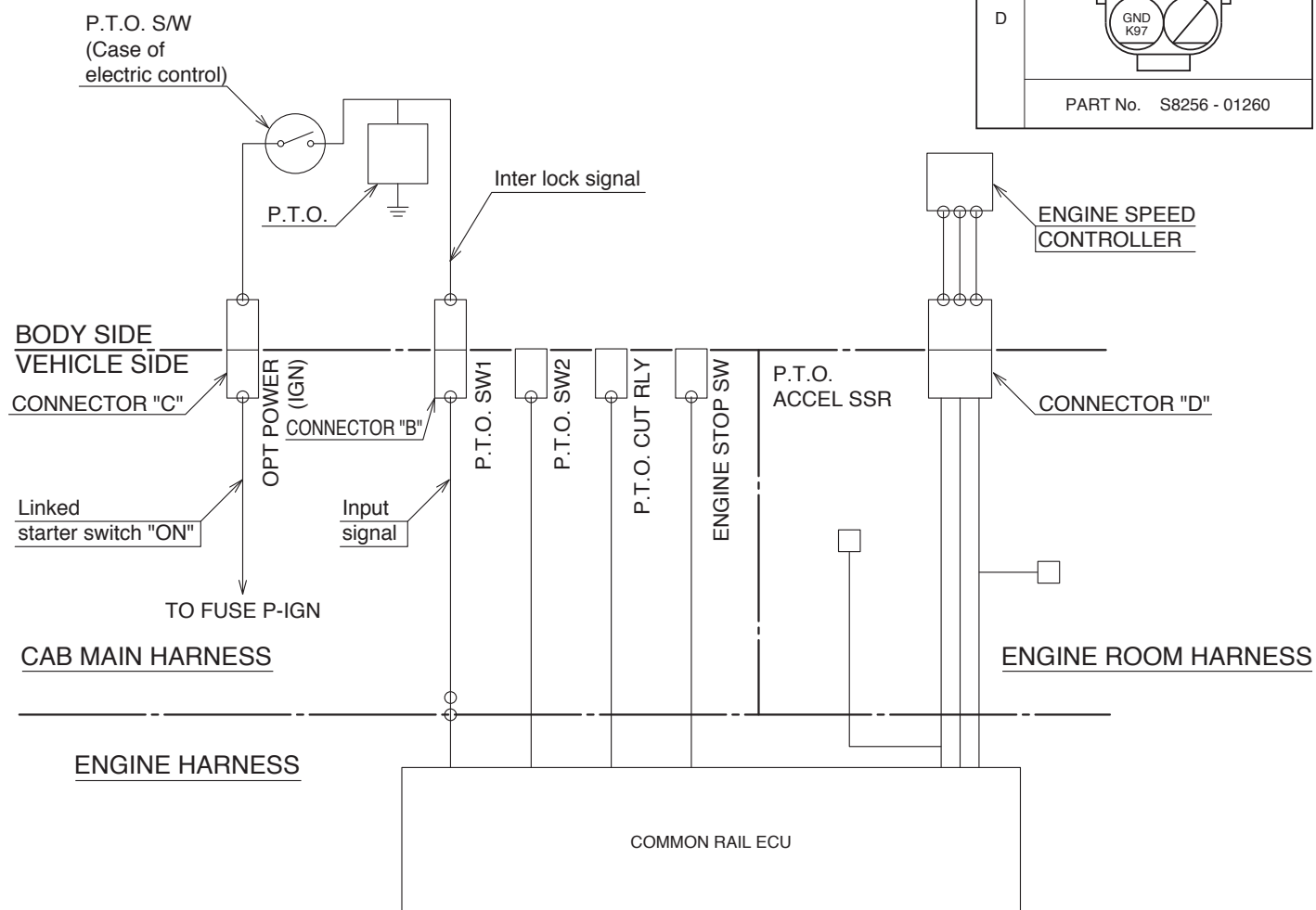
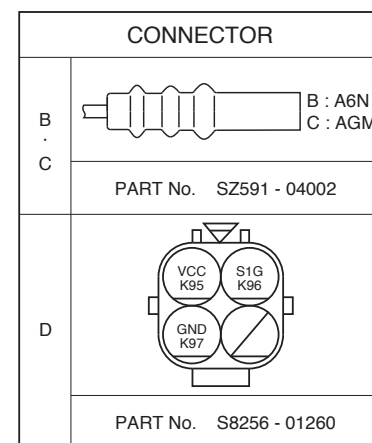
Engine revolution is controlled by the ENGINE SPEED CONTROLLER.

The electrical specification of the ENGINE SPEED CONTROLLER is described in next page.

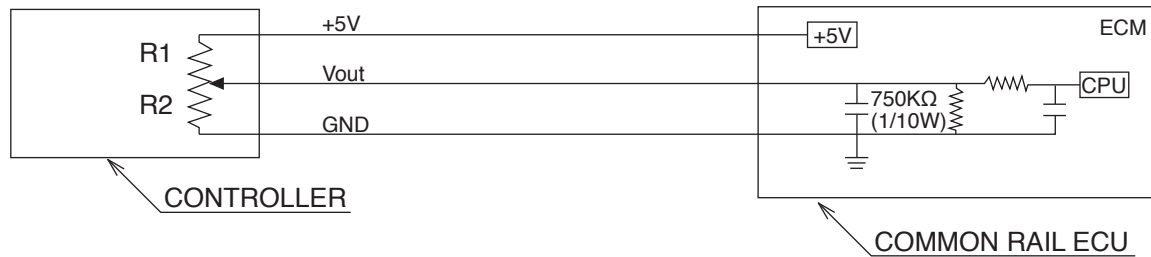
Make sure to wire the electric circuit as following figure.

When set up engine revolution, please consult with HMC.

The detail of customization is described in HINO-DXII.



## SPECIFICATION OF THE ENGINE SPEED CONTROLLER



### calculation ;

$$V_{out} = 5 \times R_2 / (R_1 + R_2)$$

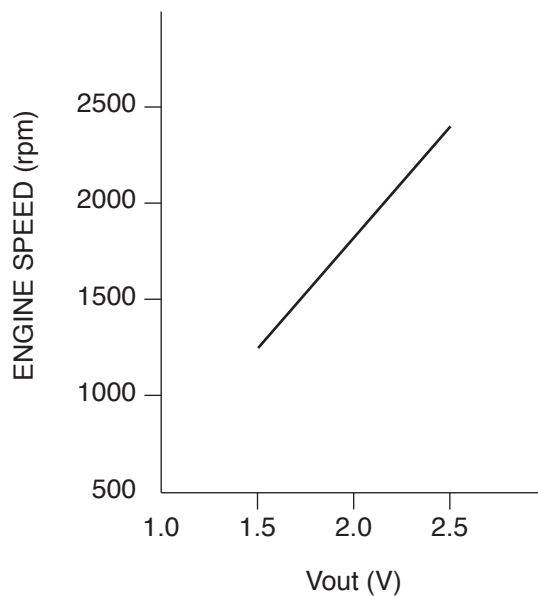
$$1/R = (1/R_2) + (1/750)$$

$$\text{Note ; } R_1 + R_2 = 2k\Omega$$

R1 (Ω)	R2 (Ω)	Vout (V)	ENGINE SPEED (rpm)
1500	500	1.25	
1450	550	1.37	
1400	600	1.5	
1350	650	1.62	
1300	700	1.75	
1250	750	1.87	
1200	800	2	
1150	850	2.12	
1100	900	2.25	
1050	950	2.37	
1000	1000	2.5	

The same voltage will not produce the same ENGINE SPEED by condition (ex. engine model).

- The graph in relation with ENGINE SPEED and Vout (for reference)



## ENGINE ACCELERATOR PROVIDED HINO GENUINE BY OPTION

The engine accelerator unit, related parts and extension wire are available from Hino authorized dealer.

Connect the connector of Engine accelerator unit with spare connector which is provided inside of right member near No.3 crossmember at chassis frame.

(Refer to chapter 7 "ELECTRICAL POWER SOURCES" for details of specifications and installed position.)

### Detail of related parts

PART NAME	PART NUMBER
Link Assy., Accelerator	78100-E0040
Lever assy., control	78130-E0010
Harness sub assy., extend	S8207-11470

### Range of control

Idle to Max. revolution. (Can be controlled variable revolution.)

### Condition of operation

- Vehicle speed must be less than 20km/h (32mile/h).
- Transmission must be in neutral position.
- Engine speed must be reduced to idle.
- Engine accelerator unit must be idle position.
- P.T.O. engagement signal must be connected to Engine Control ECU.

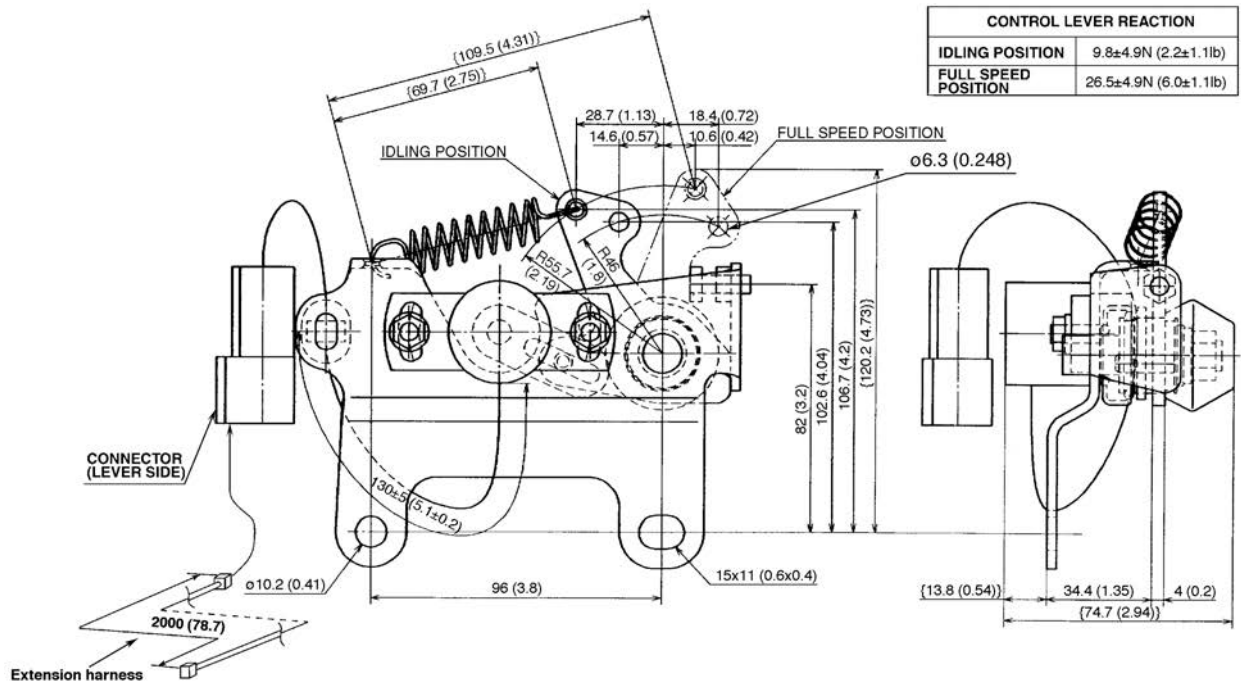
Engine speed will be controlled when the above conditions are met.

If any condition noted in the listed above is not met, engine speed control will normal be operated by accelerator pedal.

## How to install the engine accelerator

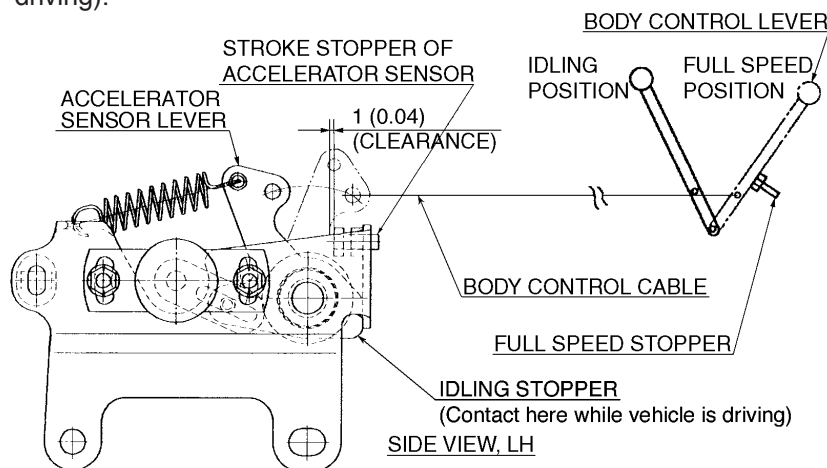
Outline figure of Engine Accelerator

Unit : mm (in.)



### How to install

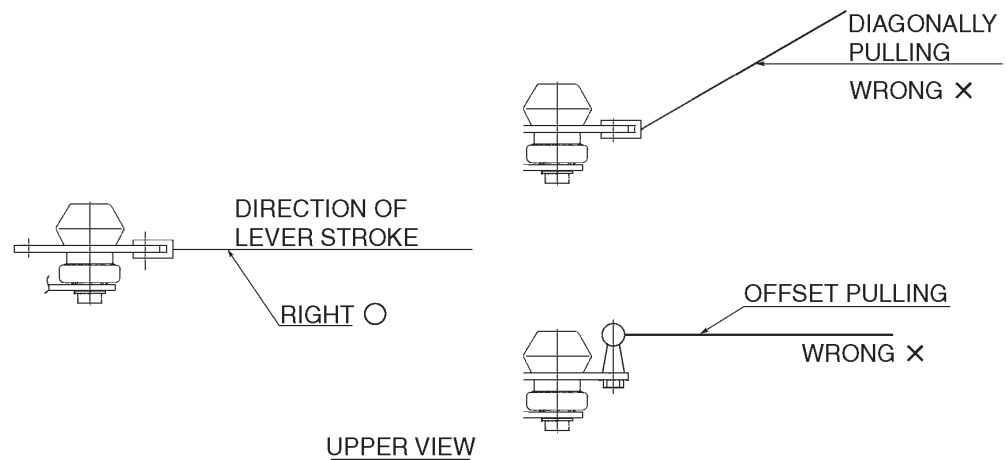
- Ensure that the body control lever is equipped with a full speed stopper, in order to control the stroke of the sensor lever.
- Adjust the body control lever so that the full speed stopper makes contact earlier than the stroke stopper of accelerator sensor.
- Ensure that the accelerator sensor lever will be in contact with the idling stopper by adjusting the speed control lever when the P.T.O. or equipment is not operating (during normal driving).



### [NOTE]

The clearance specified for the accelerator sensor stroke stopper is for reference only. If the sensor side stopper comes into contact earlier, stresses will be imposed upon the sensor shaft and may result in damage to the parts. Also, if the sensor lever does not come into contact with the idling stopper, it may result in improper engine operation during normal driving conditions.

- When installing the cable on the accelerator sensor lever, ensure that the cable pulls in a parallel direction to the lever stroke so that an imbalanced load is not applied to the sensor shaft. See the following figure.



### Cautions when installing the engine accelerator sensor

- Do not attempt to disassemble the sensor.
- Do not drop or otherwise shock the sensor, as this will lead to malfunction.
- Prevent water intrusion or direct splash.
- The sensor operating range is  $-30^{\circ}\text{C}$  to  $80^{\circ}\text{C}$  ( $-22^{\circ}\text{F}$  to  $176^{\circ}\text{F}$ ) and should only be used in that range.
- Avoid mounting the sensor in an area that may receive casual impacts.
- The sensor must be located in an area free of oil, dust, humidity, chemicals and vibration.
- If a well protected location is not available, then a cover must be installed.
- Install the wiring harness so that it is secure and not able to twist or bend.
- Refer to the Chapter 7 for instructions regarding installation of the harness.
- If the sub-harness is not long enough, extending the harness must be completed using the same type of wire.

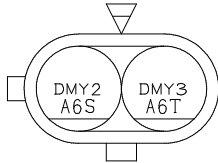
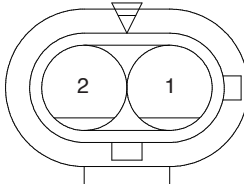
## 6. P.T.O. SIGNAL FOR ALLISON TRANSMISSION

A connector for P.T.O. control is provided.

Should connect the connector for P.T.O. information to transmission control ECU when installing P.T.O. to Allison transmission.

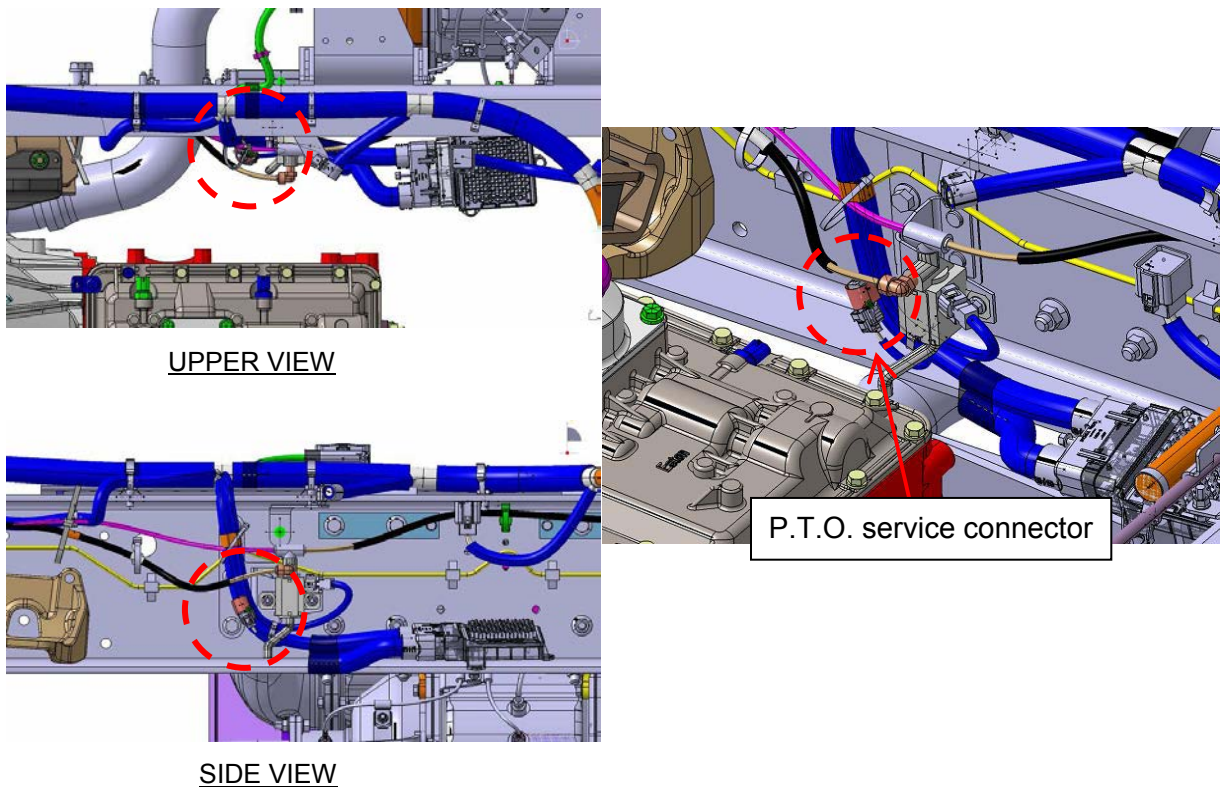
For control system data and other technical data related P.T.O. installation, contact to ALLISON Transmission Division (ATD) distributors or dealers.

### Detail of connector

	CONNECTOR	COUPLING CONNECTOR
P.T.O._SERVICE		
	PART No. S8258 - 07180B	PART No. S8258 - 07170B
	WIRE SIZE & COLOR Pole Code A6S : 0.85 Y Pole Code A6T : 0.85 L	—

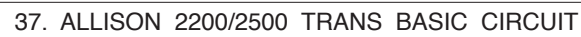
### Installing position of connector

Installed at inside of frame right side member beside transmission as shown figure below.





## Allison transmission 2200/2500 series



Allison transmission 3000 series

